



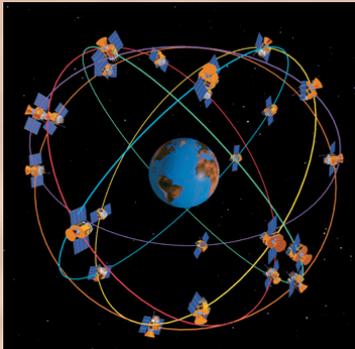
GPS Related Research at the University of Puerto Rico Mayagüez

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GPS Related Research at the University of Puerto Rico at Mayagüez

- ◆ **Defining the Centroid of Puerto Rico**
- ◆ **Establishment of the Maritime-Terrestrial Zone**
- ◆ **San Jeronimo Fort Project**
- ◆ **NOAA's Electronic Navigational Chart Validation Initiative**

Centroid of Puerto Rico

Project: Defining the Centroid of Puerto Rico

Location: Orocovis, Puerto Rico

Petitionary: Municipality of Orocovis

Date: Summer of 2001

Work: Using GIS technology to Locate the Centroid of Puerto Rico and Establishment of the Point on Ground using GPS

Applications: Validating that Orocovis is the Center of Puerto Rico

Results

- ◆ The location of the centroide of Puerto Rico was determined to be Located at the Municipality of Orocovis.
- ◆ The coordinates were determined in Puerto Rico State Plane Coordinate System - Lambert Conformal Conic Projection with Two Standard Parallels in NAD 83.

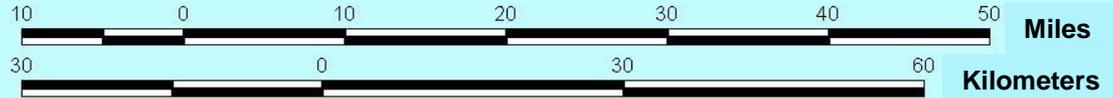
X = 200,322.93 meters, Y = 243,047.21 meters

Center of Puerto Rico



Legend

 Center of Puerto Rico



Field Location



On October 17, 2001 the Point was Located in the Municipality by the Use of GPS. In the Photograph we can see from Left to Right Prof. Luis Olivieri, Agrim. Carlos Rodríguez and Agrim. Felix Alvarado.

Maritime-Terrestrial Zone (ZMT)

Project: Establishment of the Maritime-Terrestrial Zone (ZMT) at Añasco-Mayagüez Coast

Location: Coast of Añasco and Mayagüez

Petitionary : Department of Natural and Environmental Resources

Date: August 2003 through January 2006

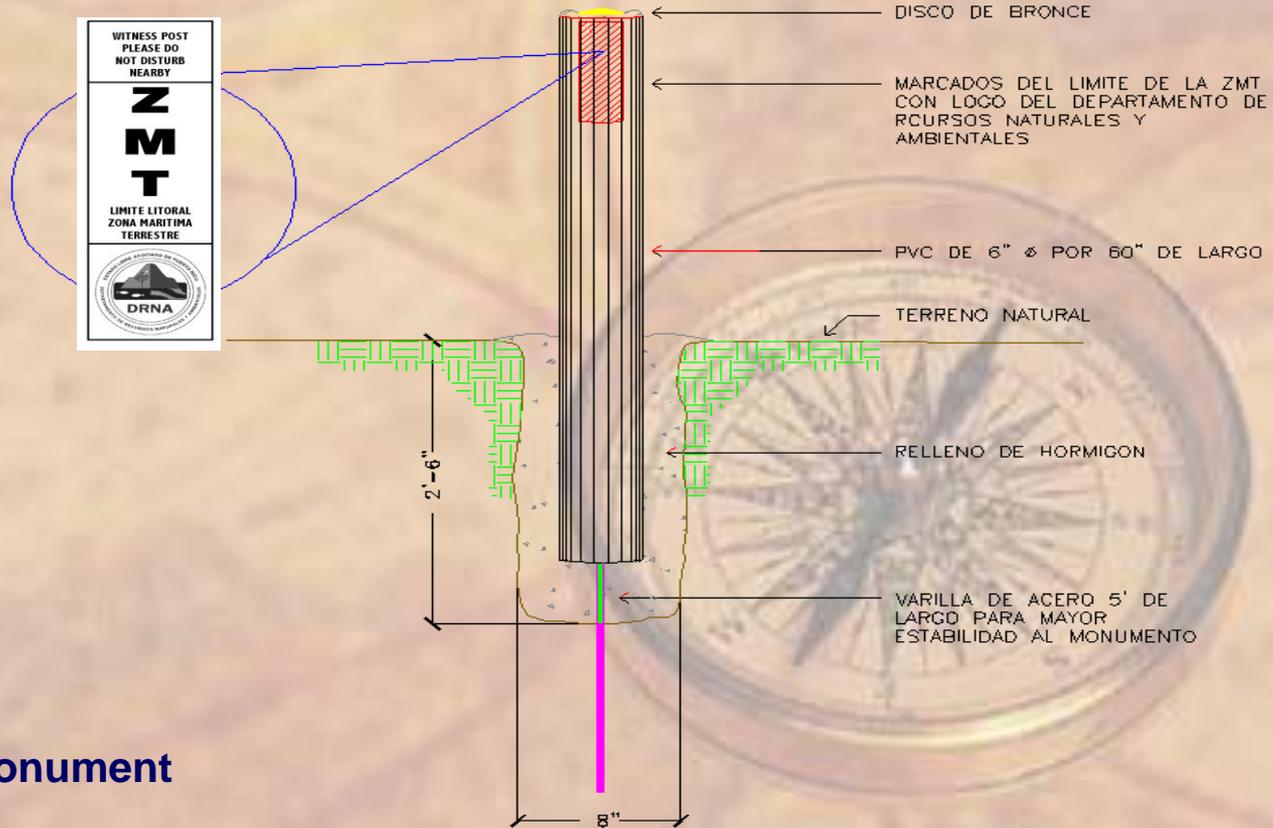
Work: Boundary Determination of the Terrestrial and Maritime Zone

Applications: Definition of the Boundary Limit of the ZMT

Recognition of Site

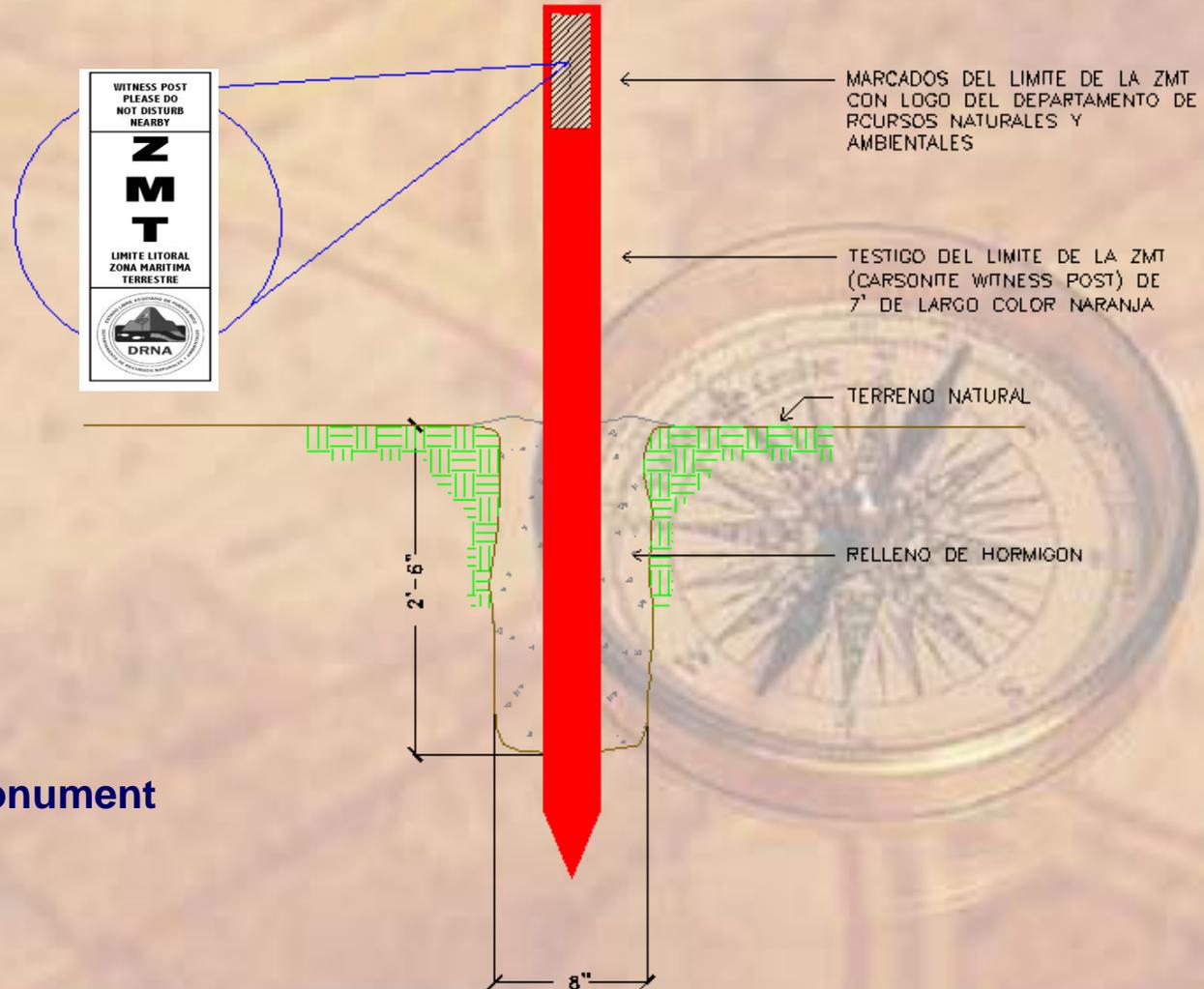


PVC Monuments



Detail of Monument
NTS

Witness Pole Monuments



Detail of Monument
NTS

Hole for the PVC Monuments



PVC Monuments



Witness Post Monuments



Data Collection Using DGPS

- UPRM GPS 34 Control Point was used as a Base Reference Station



1999 Aerial Photograph



San Jeronimo Fort Project

Project: Establishment of two Control Points and Search for the Boundaries of the Parcel of the San Jeronimo Fort

Location: Puerta de Tierra Ward San Juan, Puerto Rico

Petitionary: Instituto de Cultura Puertorriqueña

Date: May 2004 through December 2004

Work: Establishment of Two H & V Control Points using GPS that are Part of the NSRS, recover Boundaries of the Parcel using Old Maps and other Documents

Applications: Prove that the Fort had an Original Easement for it Access

San Jeronimo Fort Project



SAN GERONIMO FORT 1899



11407

San Geronimo, San Juan, P.R.

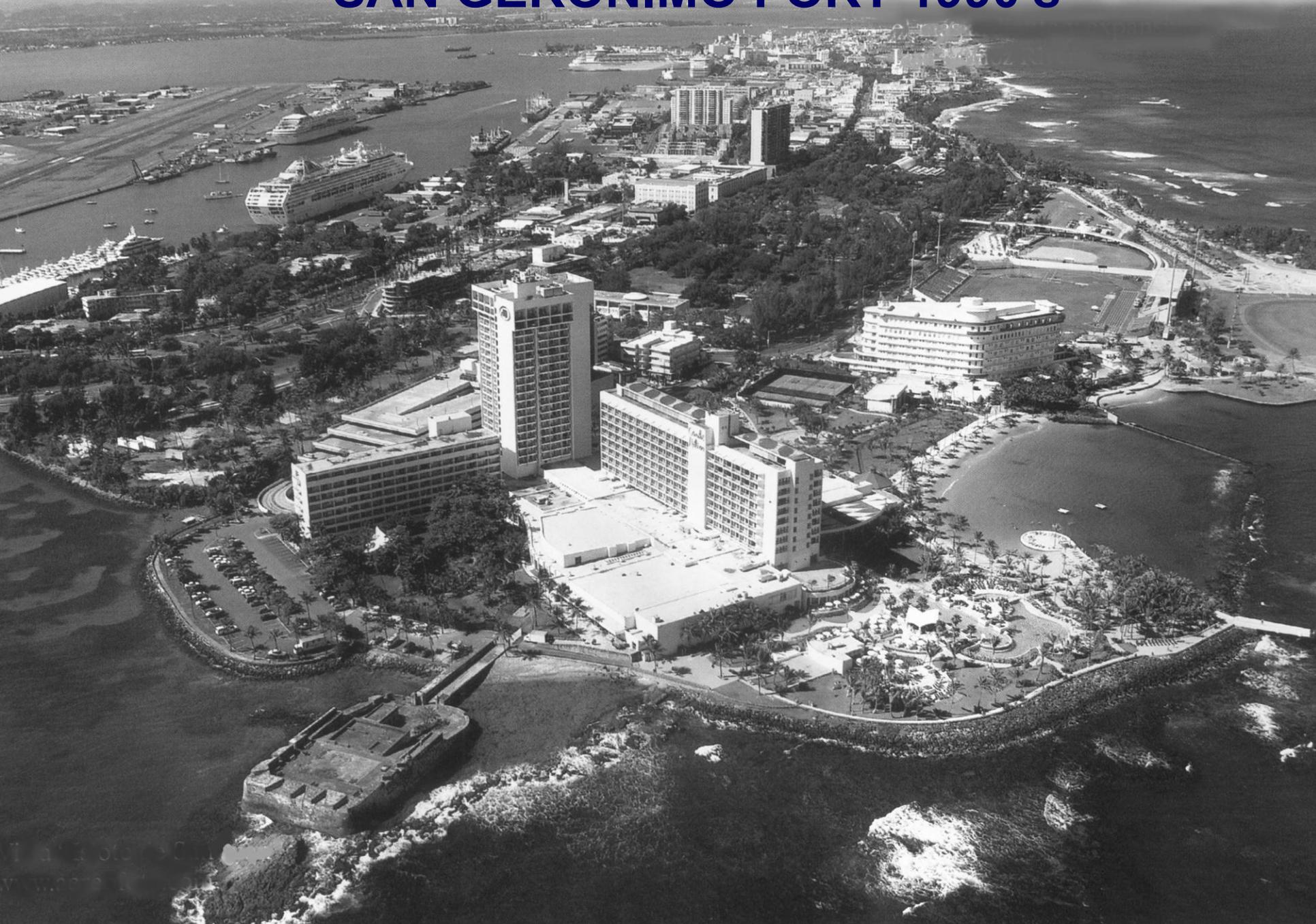
SAN GERONIMO FORT EARLY 1900's





SAN GERONIMO FORT 1970's

SAN GERONIMO FORT 1990's



Instalation of Bronze Cap for GPS Observation





GPS Observation

NOAA's Electronic Navigational Charts

Project: *NOAA's Electronic Navigational Chart (ENC)
Validation Initiative*

Location: *Coast of Ponce, Peñuelas and Guayanilla*

Petitionary: National Geodetic Survey, Remote Sensing
Division

Date: November through December 2006

Work: GPS Control Points

Applications: Update Navigational Charts and GIS of Area

NOAA Electronic Navigational Charts Validation Initiative

- ◆ **NOAA Needed Ground Control Points with GPS Observations for Geo-Referencing Purposes**



Port of Ponce, Puerto Rico

NOAA Electronic Navigational Charts Validation Initiative

- ◆ Each Ground Control Point had been Identified
- ◆ With a Total of 60 Points



Points in Docks at Guayanilla Bay

NOAA Electronic Navigational Charts Validation Initiative

- ◆ Coordinated Access with Different Land Owners, Private Companies and Local Agencies Essential



NOAA Electronic Navigational Charts Validation Initiative

◆ GPS Data Collection with PRO-XR of Trimble



Morning



Noon



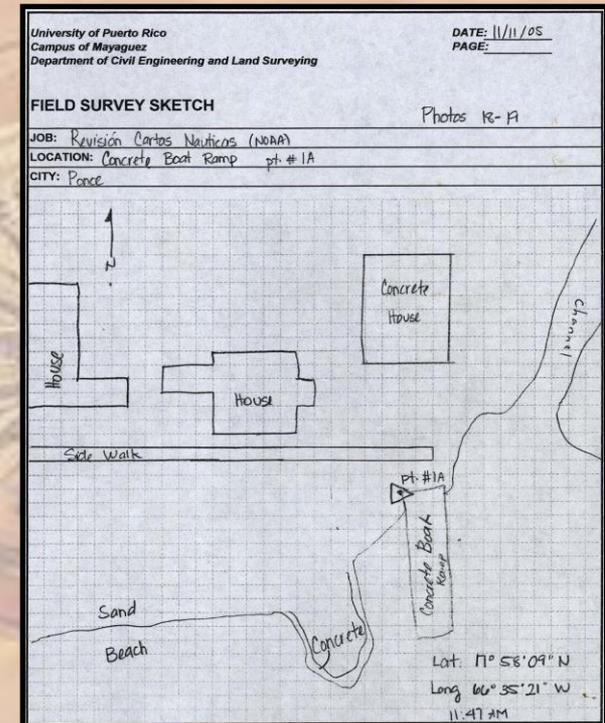
Night

NOAA Electronic Navigational Charts Validation Initiative

◆ Points had to be Photographed and Sketched



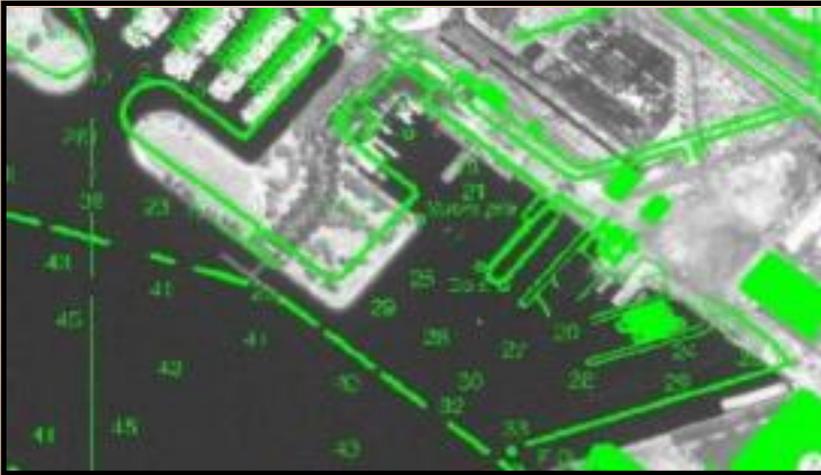
Photograph



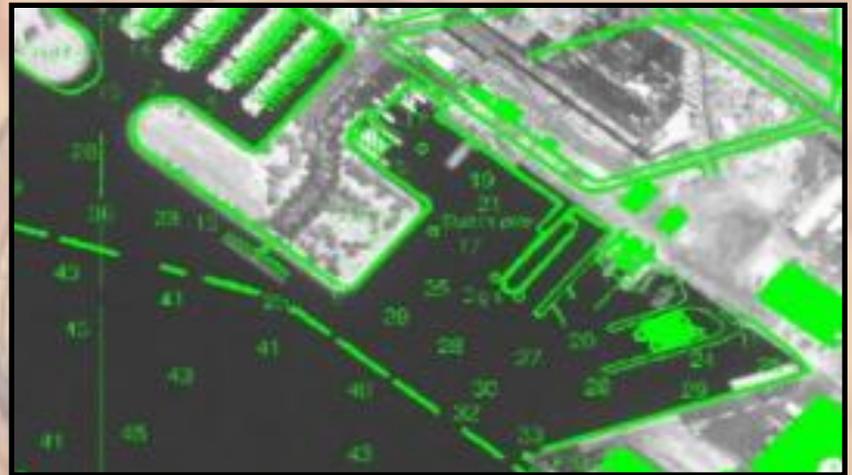
Sketch

NOAA Electronic Navigational Charts Validation Initiative

- ◆ After Being Post Processed these would be Used for Geo-Referencing Purposes



San Diego, CA: IKONOS image registration before re-georeferencing. The image and nautical chart (green lines) are not accurately registered.



San Diego, CA: IKONOS image registration after re-georeferencing. The image and nautical chart (green lines) are accurately registered.

NOAA Electronic Navigational Charts Validation Initiative

◆ Conclusions

- ◆ Highly Accurate Electronic Charts will be a Primary Cornerstone of a Safe and Efficient Marine Transportation System**
- ◆ Mariners will become Increasingly Dependent on Electronic Charts for Route Planning and Transit Monitoring in Congested Waters**

NOAA Electronic Navigational Charts Validation Initiative

◆ Special thanks to People who Collaborated in
this Project in any way



NOAA Electronic Navigational Charts Validation Initiative

- Special Thanks to NOAA for the Opportunity to be a Partner of and be able to Transmit this Experience to Others

MEMORANDUM FOR: Linda Velez Rodz
University of Puerto Rico at Mayaguez

FROM: *Michael Aslaksen*
Michael Aslaksen, Acting Chief
Remote Sensing Division
G. Michael Espey
G. Michael Espey, Acting Chief
Remote Sensing Division, Application Branch
Danielle Stuby
Danielle Stuby, Cartographer
Remote Sensing Division, Applications Branch

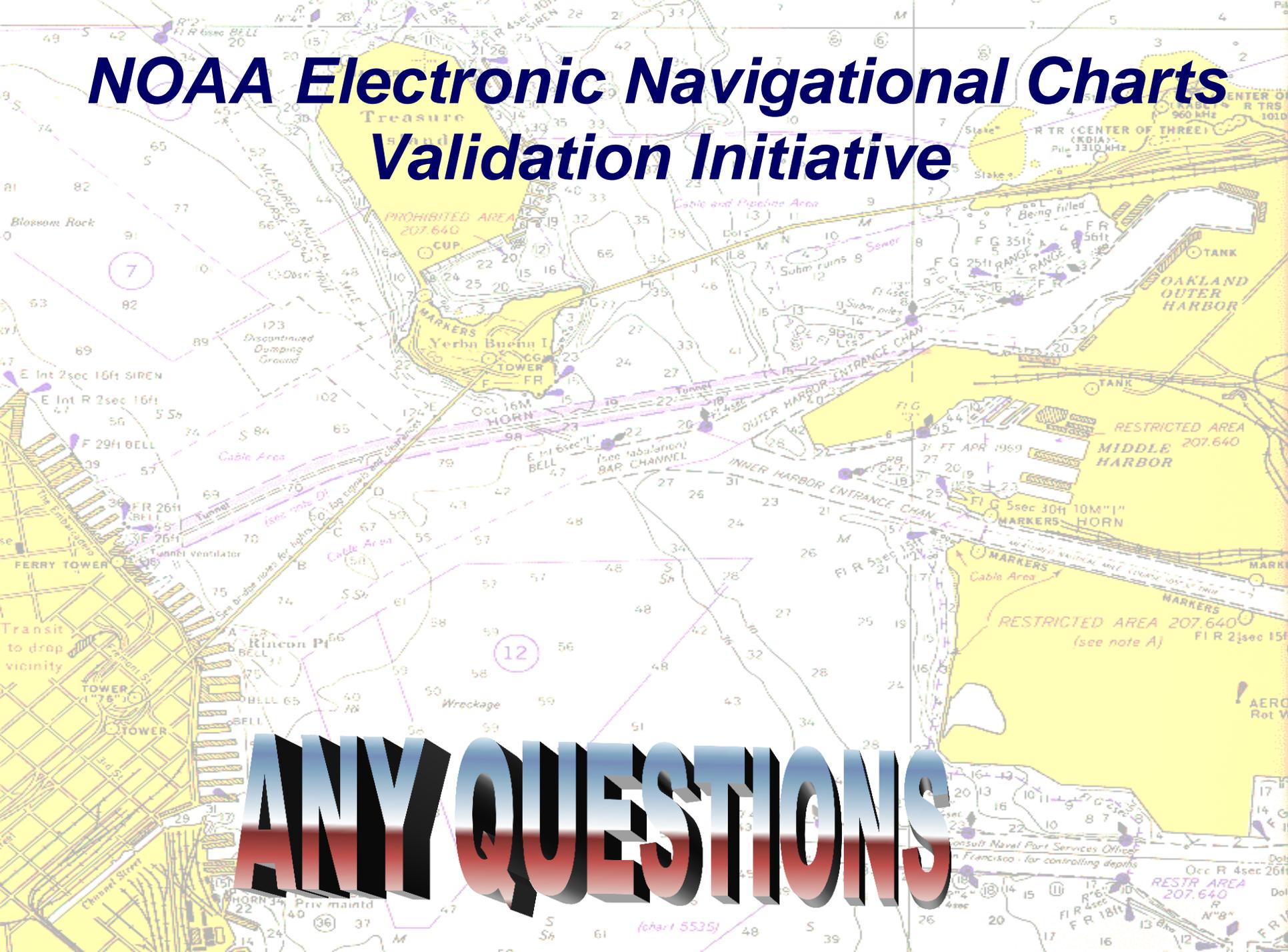
SUBJECT: Acquisition of Global Positioning System (GPS) for Ponce, Puerto Rico

The National Geodetic Survey, Remote Sensing Division (RSD) would like to recognize you and your students for the outstanding support and efforts made in obtaining valuable field data in support of NOAA's Electronic Navigational Chart (ENC) Validation Initiative. The GPS control points you provided will allow RSD to provide high resolution commercial satellite imagery that can be accurately georeferenced, and new feature data can be extracted from the imagery in order to supply critical updates to the NOAA ENC(s) covering the port of Ponce, Puerto Rico.

RSD extends our deepest appreciation for your hard work in this cooperative effort. If you have any questions concerning the subsequent use of the data collected, the role you played in the ENC Validation Initiative, or if we can be of assistance in any way, please feel free to call us.



NOAA Electronic Navigational Charts Validation Initiative



ANY QUESTIONS